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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/638,401	08/12/2003	Hirofumi Kawai	241422US2	5469
22850	7590	08/10/2004	EXAMINER	
OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			KENNEDY, JENNIFER M	
			ART UNIT	PAPER NUMBER
			2812	

DATE MAILED: 08/10/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/638,401

Applicant(s)

KAWAI, HIROFUMI

Examiner

Jennifer M. Kennedy

Art Unit

2812

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 05 May 2004.  
2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.  
4a) Of the above claim(s) 7-10 and 17-19 is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1-6 and 11-16 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☒ The specification is objected to by the Examiner.  
10) ☒ The drawing(s) filed on 12 August 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:  
1. ☒ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 8/12/03.  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.  
5) ☐ Notice of Informal Patent Application (PTO-152)  
6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Election/Restrictions***

Applicant's election without traverse of claims 1-6 and 11-16 in the reply filed on May 5, 2004 is acknowledged.

Claims 7-10, 17-19 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on May 5, 2004.

### ***Specification***

The disclosure is objected to because of the following informalities: On page 4, line 16, the examiner believes that the phrase "while a breakdown field is low at about" should be replaced with --while a breakdown field of germanium is low at about--.

Appropriate correction is required.

### ***Claim Objections***

Claims 11-16 are objected to because of the following informalities: These claims are dependent on non-elected claims. Applicant should rewrite these claims in independent form. Appropriate correction is required.

### ***Drawings***

Figures 10 and 11 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawing

sheets are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 3-5 and 11-16 rejected under 35 U.S.C. 102(b) as being anticipated by  
Ryun et al. (U.S. Patent No. 5,484,737)

Ryun et al. discloses the device comprising :

a collector layer comprising a first kind of semiconductor material (31);

a base layer including a first base portion (Si of Si/SiGe or Si/SiGe/Si layer) and a second d base portion (32, see column 4, lines 60-62), said first base portion coming in contact with the first collector layer and comprising the first kind of semiconductor material, said second base portion (SiGe of Si/SiGe or Si/SiGe/Si layer) coming in contact with the first base portion and comprising a second kind of semiconductor material; and

an emitter layer (34) coming in contact with the base layer and comprising the first kind of semiconductor material, said emitter layer forming a heterojunction with the base layer.

The examiner notes that claims 11-16 are product by process claims in which

A "product-by-process" claim is one in which the product is defined at least in part in terms of the method or process by which it is made. *Atlantic Thermoplastics Co. Inc. v. Faytex Corp.*, 23 USPQ2d 1481, 1488 (Fed. Cir 1992). Although it is noted that claim(s) 11-16 is/are product-by-process claims, product-by-process claims are directed to the product no matter how actually made. *In re Taylor*, 149 USPQ 615, 617 (CCPA 1966). Consequently, it is the patentability of the final product, and not the patentability of the process, that must be determined in a product-by-process claim. *In re Thorpe*, 227 USPQ 964, 966 (CAFC 1985), *Ex parte Edwards* 231 USPQ 981, 983 (BdPatApp&Int 1986). The examiner notes that the product of claims 7-16 result in the device as shown in Figure 1 (see specification page 21). The process of claim 7, result in the device as claimed in Claim 1. Therefore, the examiner believes the rejection of claim 1 is sufficient to reject the product formed by the process of claim 7.

In re claim 3, and 11-13, Ryun et al. discloses the device wherein an energy gap of the first kind of semiconductor material is larger than that of the second kind of semiconductor material (energy gap of silicon is 1.1 eV, energy gap of germanium is 0.67 eV, therefore the energy gap of the first kind (Si) is larger than that of the second kind (SiGe)).

In re claim 4, and 14-16 Ryun et al. discloses the device wherein a breakdown field of the first kind of semiconductor material is larger than that of the second kind of semiconductor material. (breakdown field of silicon is 30 V/ $\mu$ m, breakdown field of germanium is 8 V/ $\mu$ m, therefore breakdown field of the first kind (Si) is larger than that of the second kind (SiGe)).

In re claim 5, Ryun et al. discloses the device wherein the first kind of semiconductor material is silicon, and the second kind of semiconductor material is silicon germanium (see column 4, lines 60-61).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ryun (U.S. Patent No. 5,484,737) in view of applicant's admitted prior art (see specification pages 1-4 and Figures 10-11).

Ryun et al. discloses the device as claimed and rejected above, but does not disclose the method of forming a MIS transistor on the same chip as the bipolar transistor. AAPA discloses a device in which a bipolar transistor and a MIS transistor are formed on the same chip (see specification, page 1, lines 19-25 and Figure 10). Further, the examiner notes that applicant admit BICMOS, bipolar transistors and MOS

transistors on the same chip, are frequently used. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have a bipolar transistor and a MIS transistor on the same chip in order to have an increased degree of device integration.

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ryun (U.S. Patent No. 5,484,737) in view of Seki (U.S. Patent No. 5,032,888).

Ryun et al. discloses the device as claimed and rejected above, but does not disclose the device wherein a film thickness of the first base portion is set such that, when a bipolar transistor having the base layer, the emitter layer, and the collector layer is in a non-saturated operation state, a depletion layer extending from a junction between the collector layer and the base layer does not reach the second base layer.

The examiner notes that Seki et al. discloses that base layer thickness is chosen so as to set the breakdown voltage of the device (see column 4, lines 15-28)

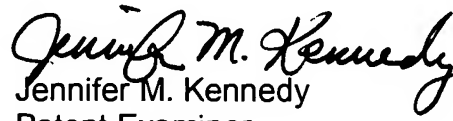
The examiner notes that Applicant does not teach that the base layer thickness solve any stated problem or are for any particular purpose other than that of preventing the lowering of the breakdown voltage. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have a film thickness of the first base portion is set such that, when a bipolar transistor having the base layer, the emitter layer, and the collector layer is in a non-saturated operation state, a depletion layer extending from a junction between the collector layer and the base layer does not reach the second base layer so as to set the breakdown voltage as Seki et al. teaches, and because it has been held that where the general conditions of a claim are disclosed

in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233, MPEP 2144.05 II A.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer M. Kennedy whose telephone number is (571) 272-1672. The examiner can normally be reached on Mon.-Fri. 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Niebling can be reached on (571) 272-1679. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Jennifer M. Kennedy  
Patent Examiner  
Art Unit 2812

jmk